Large Spark Ignition (LSI) Engine Working Group Meeting

On February 18, Air Resources Board (ARB) staff conducted the second LSI working group conference call. A discussion of each agenda item follows:

Agenda item	Discussion
Review	• Staff reviewed the two proposed LSI measures and rulemaking timeframe
LSI-2 consolidation (with LSI-1)	• No change in effective date • Harmonization and voluntary standards addressed in one document • Forthcoming ARB table will highlight differences between CARB and federal 2007 requirements; expected to be mostly in testing protocols • As a result of consolidation, does LSI 2 need to go to EPA for authorization as LSI 1 would have to do (under clean air act)
Retrofit Verification - Test cycle	• Manufacturers have been using the 7-mode steady state C2 test cycle to certify new engines, so could use in verification process but may not reflect real emissions • EPA requires transient testing for 2007 engines; there's more confidence in the test to reflect real world emissions, but it's fairly new, with steep learning curve, costs more money and takes longer, and there's less in-use test data • Explore allowing an alternative in-use test procedure (five-gas analyzer?) • Baseline inventory is premised upon steady state; steady state would be appropriate for comparative baseline levels • What would the 3.0 g/bhp-hr equate to under the transient test • 1750 hour steady state test on dyno is $250,000 (SWRI); SWRI hasn't been able to retest, and has no in-use data yet • transient cost $5,000-6,000 more than steady state C2 • Very few places can do transient test cycle right now and dyno time and capacity is limited • EPA transient test cycle not required until 2007; transient testing for retrofits would be more stringent than was required for zero-hour certification on even new 2003 LSI engines • Interested in the benefit from transient, but understand technology must provide emission benefit w/o being burdensome
Retrofit Verification - In use emissions and warranty Durability / useful hours	• Where should the emissions bar be set? What age of equipment to put on, will retrofits be mandatory? What is realistic emission reduction level, test method, hours required for durability testing • Will engine test be on a dyno or as installed on equipment? • Initial certification testing would require engine to be tested on an engine dyno • 2007 EPA rule allows for a given number of pieces of equipment to be tested for in-use. • ARB will look at other ARB programs related to retrofits that require

	in-use enforcement
	• Cost to perform durability testing and engine calibration exceeds $1M and this could be for a small number of engines
	• What is the appropriate in-use level when you certify a retrofit via SS to 3.0 g/bhp-hr?
	• Typically, we would certify kit by emission control group (industry selects representative emission control group). Then, for any given kit, the emission control group identifies which engines it will work on.
	• We use statistical approach to determine in-use compliance: would find representative sampling of used equipment, test with and without the system
	• Would then take corrective action toward manufacturer at that time
	• Consequences of failing in-use enforcement – pulled executive order, lost emission benefit
	• Actual emission benefits of retrofits on existing engines could vary depending on the baseline emission level of these engines. Significant variation in emission benefit could exist due to differences in the initial condition of the base engines
Inventory	• ITA members know what engines/lifts were shipped to CA, even prior to 2000, but not how many are still alive or in the State
	• Dealers know how many they service, but a lot of maintenance is done in-house.
	• What is industry practice, rebuild or replace?
	• Some are more economical to rebuild
	• We have inventory information on the number of emission-certified gas engines for 2001+
	• We have lift inventory information from the 1995 Gas Research Institute report
	• Up to 50 percent of lifts are rentals, typically in a 3-5 year lease cycle
	• Who bears cost of the retrofit, rental company or end user?
Sub-committees	• Working group members may additionally participate on topic-specific subcommittees (e.g., verification protocol)